THE CADASTRAL SYSTEM OF THE USA AND UZBEKISTAN: DEVELOPMENT TRENDS AND PROBLEMS

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Abstract. *The article analyzes the development trends of the cadastral systems of Uzbekistan and the United States and their problems. In the experience of Uzbekistan, the legal basis of the cadastral system, digitization processes, the use of artificial intelligence and 3D modeling technologies, and the use of international experience are covered. In the US cadastral system, the historical basis, the Public Land Survey System (PLSS) and Metes-and-Bounds systems, basic principles, as well as modern digital, 3D and marine cadastre are studied. Through a comparative analysis, the similarities and differences of the cadastral systems of the two countries are identified and scientific conclusions are given on their further improvement.*

Keywords *Cadastral system, Uzbekistan, USA, PLSS, Metes-and-Bounds, digitization, artificial intelligence, 3D cadastre, legal basis, land resources management, international experience.*

Enter The cadastral system is an important element of accounting and management of land resources, real estate objects and other spatial data in each country. In Uzbekistan, the process of reforming the cadastral system, its digitization and adaptation to international standards has been rapidly progressing in recent years.

This process not only increases the efficiency of state administration, but also significantly facilitates the convenience of providing services to the population.

Main part Legal framework of the cadastral system in Uzbekistan The maintenance of the cadastral system is regulated by a number of laws and government resolutions of the Republic of Uzbekistan.

In particular, **"Regulation on the state cadastre of buildings and structures"** (2023-yil) is one of the main legal documents in this field [1]. In addition, the September 9, 2024 **555-numerical decision** The procedure for cadastral division of territories and the formation of cadastral numbers for real estate objects was established [2]. Digitization and new technologies

In recent years, large-scale reforms have been carried out in Uzbekistan to digitize the cadastral system. The "Integrated Information System of Cadastre and Registration" (UZKAD) has been introduced, which consolidates real estate objects, land plots and other spatial data in a single database. It is also emphasized that the digitization process has not yet been fully regulated in legal terms [3].

Problems of artificial intelligence and 3D modelsThe current cadastral system is based mainly on 2D models and faces difficulties in accurately representing buildings and structures located on top of each other.

Therefore, there is a need to introduce artificial intelligence and 3D modeling technologies [4]. With the help of artificial intelligence, it is possible to automatically process and analyze spatial data, but this process is not yet fully regulated in terms of regulatory and legal aspects.

Using international experience

It is important to study international experience in the development of the cadastre system.

For example, in countries such as France, Germany, Great Britain and Sweden, a single state cadastre database of buildings and structures has been formed. Scientific proposals have been developed on the application of these experiences in Uzbekistan [5]. Practical reforms and convenience for the population

Uzbekistan plans to eliminate the hassle of the population in collecting various documents by radically reforming the cadastre system. In particular, the possibilities of obtaining information through a single electronic database are expanding [6].

The Cadastre Agency has also been established, the main tasks of which are to implement state policy and coordinate reforms in the field [7]. In the United States, cadastral systems play a key role in the management of land resources and the regulation of legal relations.

The Public Land Survey System (PLSS), introduced by the Land Ordinance of 1785, is being developed as an indicator of land identification and distribution. The factors, principles, practices, and results of scientific analysis in recent years of the US cadastral system

The US cadastral system is designed to:

Define and protect land ownership rights.

Equitable distribution of public and private lands.

Determine land accounting for taxation purposes.

Integrate land disputes and ensure legality.

Support urban development, agriculture, and infrastructure development.

Effective provision of public resources, assistance, and federal lands [8]

The US cadastral system operates on several basic principles:

Transparency: making all land information and disclosure available.

Legal certainty: strictly regulating land rights, boundaries, and ownership.

Standardization: All land units are measured uniformly through PLSS.

Technological integration: GIS, GPS, and 3D cadastral technologies are used.

Sustainability: based on resource-efficient and resource-efficient use [9]. The PLSS system was formed by the Land Ordinance of 1785, which provided for the organization of land in the western United States based on geometric divisions. Each township is 6 miles × 6 miles in size, divided into 36 sections. Each section is 1 square mile (640 acres). In the eastern states, the Metes-and-Bounds system is more widely used [8], [9].

In recent years, the US cadastral system has been enriched with modern technologies:

Digital cadastre: not all land data is stored electronically.

3D Cadastre: captures the terrain and multi-story buildings [11].

Marine Castre: developed by NOAA for marine resources and resource management [10]. Geoportals: interactive productions and databases for opportunities [12]. Buhler (2006) analyzed the differences between PLSS and Metes-and-Bounds systems in his study, noting the territorial order and uniformity as the advantages of PLSS [8].

ScienceDirect articles emphasize that although PLSS is effective in rural areas, there are adaptation problems in complex natural areas [12].

NOAA Marine Cadastre is presented as an important tool for regulating legal and economic relations in water areas [10].Enemark et al. (2005) emphasize that modern land administration systems in the USA are being built on the basis of GIS The US cadastral system occupies a special place in the world with its ancient history, strict principles and comprehensive goals.

While simple and standardized land divisions were created through PLSS, in the modern era the system is being further improved through digital and 3D cadastral systems. Marine cadastre is also one of the new areas of the system, which is important for the integrated management of land and water resources in the United States.

Conclusion

The cadastral systems of Uzbekistan and the United States have their own stages of development. In Uzbekistan, the priority is the digitization of the system, the introduction of 3D technologies and the use of international experience, while in the United States, a standardized mechanism for land use through PLSS has historically been formed. Today, both countries are striving to further improve the system through the development of GIS, 3D cadastre and digitization processes.

References

1. Lex.uz. Binolar va inshootlarning davlat kadastri to‘g‘risida Nizom. https://lex.u
2. Lex.uz. Hududlarni kadastr bo‘yicha bo‘lish va ko‘chmas mulk obyektlarining kadastr raqamlarini shakllantirish tartibi
3. Toshboyeva, R. S. Digital Technologies in the National Cadastre System of Uzbekistan: Issues of Legal Regulation. ResearchGate.
4. Toshboyeva, R. S. Artificial Intelligence in the Cadastral System of Uzbekistan: Application Problems and Solutions. Museonaturalistico.
5. Uspankulov, B. va boshqalar. Foreign experience and technologies in the formation of a state cadastral database of buildings and structures. E3S Conferences.
6. Yuz.uz. Tubdan isloh qilinayotgan kadastr tizimi aholi ovoragarchiligiga barham beradi. https://yuz.uz
7. Kun.uz. Kadastr agentligining asosiy vazifalari ma’lum bo‘ldi.
8. Bureau of Land Management (BLM). Public Land Survey System (PLSS) https://www.blm.gov/services/geospatial/GISData
9. Buhler, J. (2006). The U.S. Public Land Survey System: Foundation for Modern Land Information Systems. Journal of Surveying Engineering.
10. NOAA. Marine Cadastre. https://marinecadastre.gov
11. Enemark, S., Williamson, I., & Wallace, J. (2005). Building modern land administration systems in developed economies. Computers, Environment and Urban Systems, 29(5).
12. ScienceDirect. Public Land Survey and Cadastre Studies in the U.S. https://www.sciencedirect.com